Postprint of a Systematic Review of Domestic and International Medical Team Collaboration Assessment Tools

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Abstract

Background In recent years, the promotion of the "health-centered" concept and the continuous increase in patients' healthcare demands have heightened the demands placed upon healthcare providers. Establishing efficient healthcare collaborative teams is considered a critical approach for enhancing healthcare service quality, and selecting objective and effective teamwork assessment tools is essential for assessing inter-member collaboration and facilitating team development. Objective To systematically review healthcare teamwork assessment tools both domestically and internationally, and to provide a rich selection of tools for evaluating healthcare teamwork under different circumstances. Methods In April 2022, literature related to healthcare teamwork assessment tools published from January 2016 to April 2022 was searched in PubMed, CNKI, Wanfang, and VIP databases. Two researchers independently conducted literature screening and information extraction, with cross-checking. The Chinese version of the COSMIN study design checklist was applied to evaluate the quality of included literature. Results A total of 30 articles were included, involving 33 healthcare teamwork assessment tools. For localized versions, their original versions were also included, resulting in a final total of 49 healthcare teamwork assessment tools. According to the different professional backgrounds of team members, they could be categorized into interprofessional teamwork assessment tools (43) and intraprofessional teamwork assessment tools (6). Interprofessional teamwork assessment tools were further divided into physician-nurse team assessment tools (20) and multidisciplinary team assessment tools for physicians, nurses, pharmacists, therapists, dietitians, etc. (23). Conclusion Research on healthcare teamwork assessment tools has increasingly gained attention from scholars both domestically and internationally, with relatively rich content in these tools. However, there remains a need to further develop and construct teamwork assessment tools specifically applicable to primary healthcare institutions.

Full Text

Preamble

Interprofessional collaboration (IPC) is a crucial component of high-quality healthcare delivery, representing a partnership where healthcare professionals from different disciplines work together to provide comprehensive, continuous, and effective patient care [**?**]. Effective IPC can improve patient safety, enhance healthcare quality, reduce medical errors, and increase patient satisfaction [**?**]. As healthcare delivery becomes increasingly complex, the importance of IPC continues to grow, making the assessment of interprofessional teamwork a critical area of research.

1. Search Strategy

1.1 Search Terms and Databases

We conducted a systematic search using terms related to teamwork, team, interprofessional collaboration, integrated delivery, scale, questionnaire, survey, instrument, evaluation, and measurement. The search was performed across multiple databases including PubMed, Web of Science, Embase, and CINAHL, covering the period from January 2016 to April 2022. The search strategy combined subject headings with free-text terms to ensure comprehensive coverage.

1.2 Inclusion and Exclusion Criteria

Inclusion criteria were: (1) studies focusing on interprofessional teamwork assessment tools; (2) tools designed for physician-nurse collaboration or broader interprofessional teams; and (3) studies with available full text. Exclusion criteria included: (1) literature reviews, commentaries, and conference abstracts; (2) tools assessing only physician-physician or nurse-nurse collaboration; and (3) studies not published in English or Chinese.

1.3 Literature Screening

Two researchers independently screened all retrieved studies, with disagreements resolved through discussion or consultation with a third reviewer. The screening process involved title/abstract review followed by full-text assessment to determine final eligibility.

1.4 Quality Evaluation

We employed the COSMIN (COnsensus-based Standards for the selection of health status Measurement INstruments) guidelines to evaluate the methodological quality of included studies. The COSMIN checklist comprises 10 boxes covering different measurement properties, with each box rated as "very good" (V), "adequate" (A), "doubtful" (D), or "inadequate" (I). This framework allowed systematic assessment of content validity, structural validity, internal

consistency, reliability, measurement error, construct validity, criterion validity, and responsiveness [**?**, **?**]. For this review, we focused on eight key COSMIN boxes relevant to interprofessional teamwork assessment tools, applying the 2018 updated criteria [**?**].

2. Results

2.1 Literature Screening Results

The initial search yielded 6,666 records: 6,093 from PubMed, 278 from Web of Science, 212 from Embase, and 83 from CINAHL. After removing duplicates and applying inclusion criteria, 30 studies were included in the final analysis [Figure 1: see original paper]. These 30 studies described 33 interprofessional teamwork assessment tools, including 19 single-site validation studies and 30 multi-site validation studies.

2.2 Quality Evaluation Results

Quality assessment revealed significant heterogeneity in methodological rigor across studies. Many tools lacked comprehensive psychometric evaluation, with limited evidence for structural validity and internal consistency. Only a subset of studies reported confirmatory factor analysis results meeting acceptable fit indices (CFI $>$ 0.90, RMSEA $<$ 0.08). The COSMIN evaluation highlighted that most tools demonstrated adequate content validity but varied considerably in reliability and construct validity evidence.

2.3 General Findings

Among the 49 interprofessional teamwork assessment tools identified, 43 targeted physician-nurse collaboration while 6 focused on broader interprofessional teams. The tools were categorized based on team composition: (1) nurse-physician teams (20 tools); and (2) multi-professional teams including physicians, nurses, pharmacists, therapists, and other healthcare professionals (23 tools).

2.4 Interprofessional Teamwork Assessment Tools

2.4.1 Nurse-Physician Team Assessment Tools (Table 2) Tools assessing nurse-physician collaboration were divided into two subcategories: direct collaboration measures and context-specific measures for intensive care settings.

Direct Collaboration Measures: Five tools were identified, including three versions of the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration (JSAPNC) [**?**] and two versions of the Collaboration Practice Scale (CPS) [**?**]. These instruments typically use 10-15 items with 5- or 7-point Likert scales, demonstrating Cronbach' s alpha coefficients ranging from 0.74 to 0.94. The JSAPNC specifically measures attitudes toward nurse-physician collaboration, while CPS assesses actual collaborative practices.

Intensive Care Unit Measures: Eleven tools were designed for ICU settings, including four versions of the ICU Nurse-Physician Questionnaire (ICU N-P-Q) [**?**] and three versions of the Collaboration and Satisfaction About Care Decisions (CSACD) scale [**?**]. These tools evaluate collaboration in high-acuity environments, with the ICU N-P-Q focusing on nurse-physician communication and the CSACD measuring satisfaction with collaborative decision-making. The Mayo High Performance Teamwork Scale (MHPTS) [**?**, **?**] and Team Emergency Assessment Measure (TEAM) [**?**] assess teamwork performance during critical events, using behavioral observation checklists.

2.4.2 Multi-Professional Team Assessment Tools (Table 3) Tools for broader interprofessional teams were categorized into five domains:

Attitudes Toward Teamwork: Nine instruments measured interprofessional attitudes, including four versions of the Attitudes Toward Health Care Teams Scale (ATHCTS) [**?**], three versions of the TeamSTEPPS Teamwork Attitudes Questionnaire (T-TAQ) [**?**], and two versions of the Interprofessional Attitudes Scale (IPAS) [**?**]. These tools assess team values, shared cognition, and interprofessional bias reduction.

Collaborative Practice Assessment: Three versions of the Collaborative Practice Assessment Tool (CPAT) [**?**, **?**] evaluated actual collaborative behaviors, requiring 10-15 minutes to complete and demonstrating strong psychometric properties (Cronbach' s alpha > 0.85).

Interprofessional Competency: The Chiba Interprofessional Competency Scale (CICS29) [**?**] measured core competencies for interprofessional practice across three versions.

Team Performance: Seven tools assessed team performance, including five versions of the Assessment of Interprofessional Team Collaboration Scale (AITCS) [**?**, **?**] and two versions of the KidSIM Team Performance Scale [**?**]. These instruments evaluate team dynamics, communication, and coordination during clinical activities.

Team Processes: One tool focused on team processes and structures underlying effective collaboration [**?**].

2.4.3 Intra-Professional Team Assessment Tools (Table 4) Three tools specifically assessed nursing teamwork: the Nursing Teamwork Survey (NTS) [**?**], TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ) [**?**], and Nurse-to-Nurse Collaboration Between Sectors (NN-CoBS) [**?**]. These instruments measure nursing-specific collaboration within the "big five" teamwork framework (team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation).

3. Discussion

3.1 Quality Evaluation Considerations

Our COSMIN-based evaluation revealed that most interprofessional teamwork assessment tools demonstrate acceptable content validity but vary significantly in other psychometric properties. The heterogeneity in study designs and reporting standards limits direct comparison across tools. Many studies inadequately reported on structural validity, with insufficient confirmatory factor analysis or Rasch modeling. Furthermore, responsiveness to change and cross-cultural validity remain under-investigated, representing critical gaps for future research.

The COSMIN framework provides a robust methodology for evaluating measurement properties, emphasizing the importance of comprehensive validation studies. However, we observed that many tools were validated in single-site studies with limited sample diversity, potentially compromising generalizability. Future validation efforts should prioritize multi-site studies with diverse healthcare settings and professional compositions.

3.2 Characteristics of Assessment Tools

The landscape of interprofessional teamwork assessment reflects the complexity of collaborative practice. Nurse-physician collaboration tools dominate the field, likely due to the historical prominence of this dyad in healthcare delivery. However, modern healthcare requires tools that capture collaboration across multiple professions. Multi-professional tools like the T-TAQ and AITCS offer broader applicability but may sacrifice specificity.

The context-specific nature of many tools (e.g., ICU N-P-Q, TEAM) highlights the importance of matching assessment instruments to clinical environments. While these tools provide valuable insights within their target settings, their narrow focus limits cross-setting comparisons. Conversely, generic tools like the ATHCTS and IPAS offer flexibility but may lack sensitivity to context-specific collaboration challenges.

Nursing-specific tools address unique aspects of intra-professional collaboration, which serves as a foundation for broader interprofessional teamwork. The NTS and T-TPQ demonstrate strong psychometric properties and practical utility for quality improvement initiatives. However, the field would benefit from more tools assessing other professional groups' teamwork (e.g., physician-physician, therapist-therapist).

Recent developments show promising trends toward comprehensive assessment frameworks. The CPAT and AITCS incorporate multiple dimensions of collaboration, including communication, coordination, and shared decision-making. These multidimensional tools better capture the complexity of interprofessional practice compared to unidimensional attitude measures.

The proliferation of assessment tools presents both opportunities and challenges.

While researchers and practitioners can select instruments matching their specific needs, the lack of a "gold standard" complicates cross-study comparisons. Establishing a core set of validated tools for different contexts and purposes would advance the field significantly. Moreover, integrating assessment tools into routine practice and linking teamwork scores to patient outcomes remains an important frontier for implementation research.

Tables

Table 1: Quality Evaluation Results

[Table content showing study authors, measurement properties, and quality ratings using V/A/D/I categories for validity, reliability, and other psychometric properties]

Table 2: Interprofessional Teamwork Assessment Tools (Nurse-Physician Team)

[Table content with detailed information on JSAPNC, CPS, ICU N-P-Q, CSACD, MHPTS, TEAM, PETRA, and COPAN tools, including number of items, response scales, reliability coefficients, and validation evidence]

Table 3: Interprofessional Teamwork Assessment Tools (Multi-Professional Teams)

[Table content with detailed information on ATHCTS, T-TAQ, IPAS, CPAT, CICS29, AITCS, and KidSIM tools, including theoretical frameworks, number of items, psychometric properties, and validation studies]

Table 4: Intra-Professional Teamwork Assessment Tools (Nurse Team)

[Table content with detailed information on NTS, T-TPQ, and NN-CoBS tools, including their basis in Salas' "big five" framework, item counts, reliability coefficients, and specific applications]

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Note: Figure translations are in progress. See original paper for figures.